American basswood

Tilia americana

Basswood is a fast-growing species and an important component of the maple-basswood forest type in northern Wisconsin. The **volume of basswood has increased** since 1983. In the last 10 years, **growth rates have increased** and **mortality has decreased.** In 2012, basswood accounted for 5.5% of all volume in Wisconsin, but only 2.2% of total mortality and 4.9% of growth.

Basswood is **not an important timber species**, accounting for only 4.2% of roundwood product. Currently, we harvest less than half of total growth. The density of basswood is the lowest of all hardwood species which makes it less desirable for biofuel production.

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"How has the basswood resource changed?"

Growing stock volume and diameter class distribution by year

The growing stock volume of basswood in 2012 was about 1.2 billion cft or over 5.6% of total statewide volume (Chart 1). Volume has increased 44% since 1983 but has changed little since 1996.

The **basswood resource has aged** since 1983. For instance, the volume in large trees (over 13 inches in diameter) has more than doubled in this time (Chart 2).

In the last ten years, however, the number of seedlings, saplings, and poles has decreased significantly (Chart 3), suggesting a possible decrease in future populations of basswood.

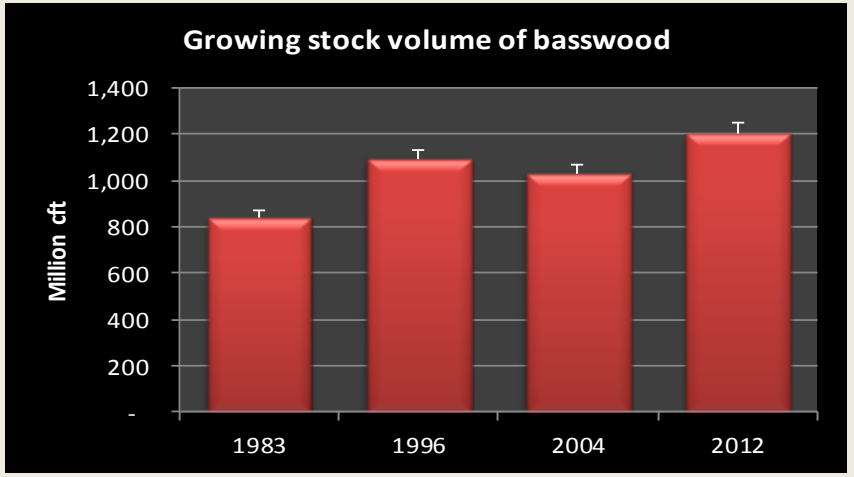


Chart 1. Growing stock volume (million cubic feet) by inventory year.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

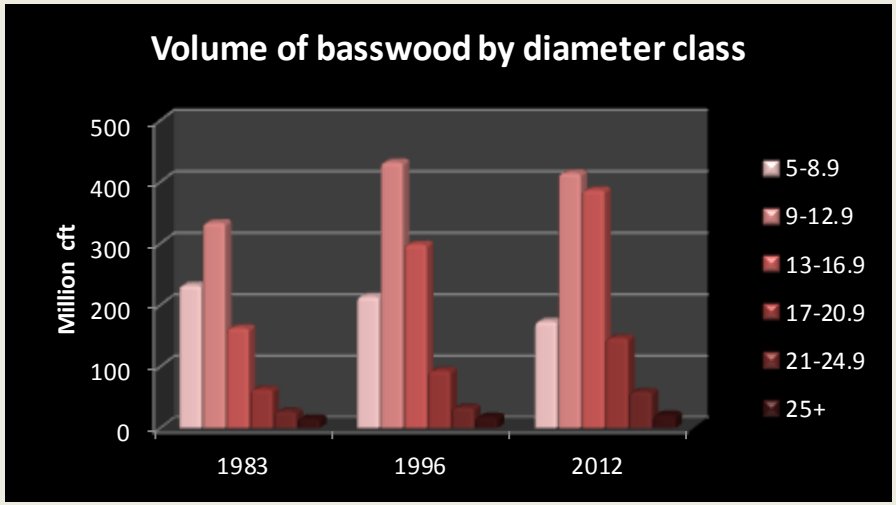


Chart 2. Growing stock volume (trees over 5 inches dbh) in million cubic feet in 1983, 1996, and 2012.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

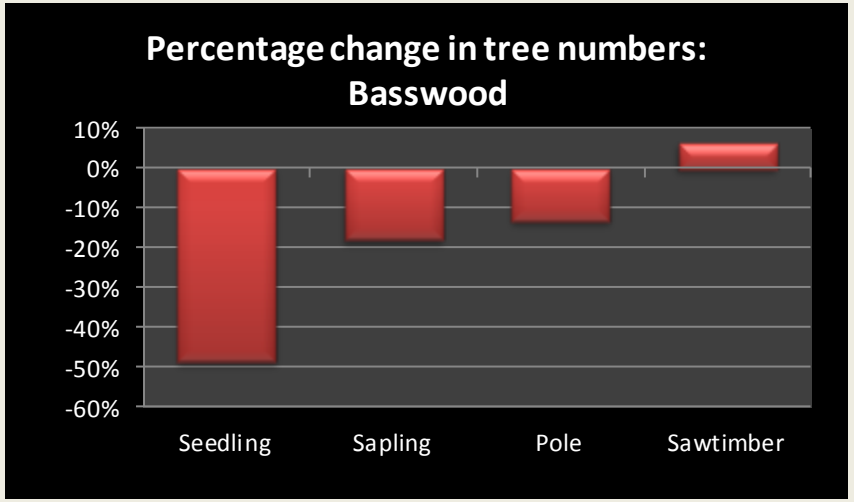
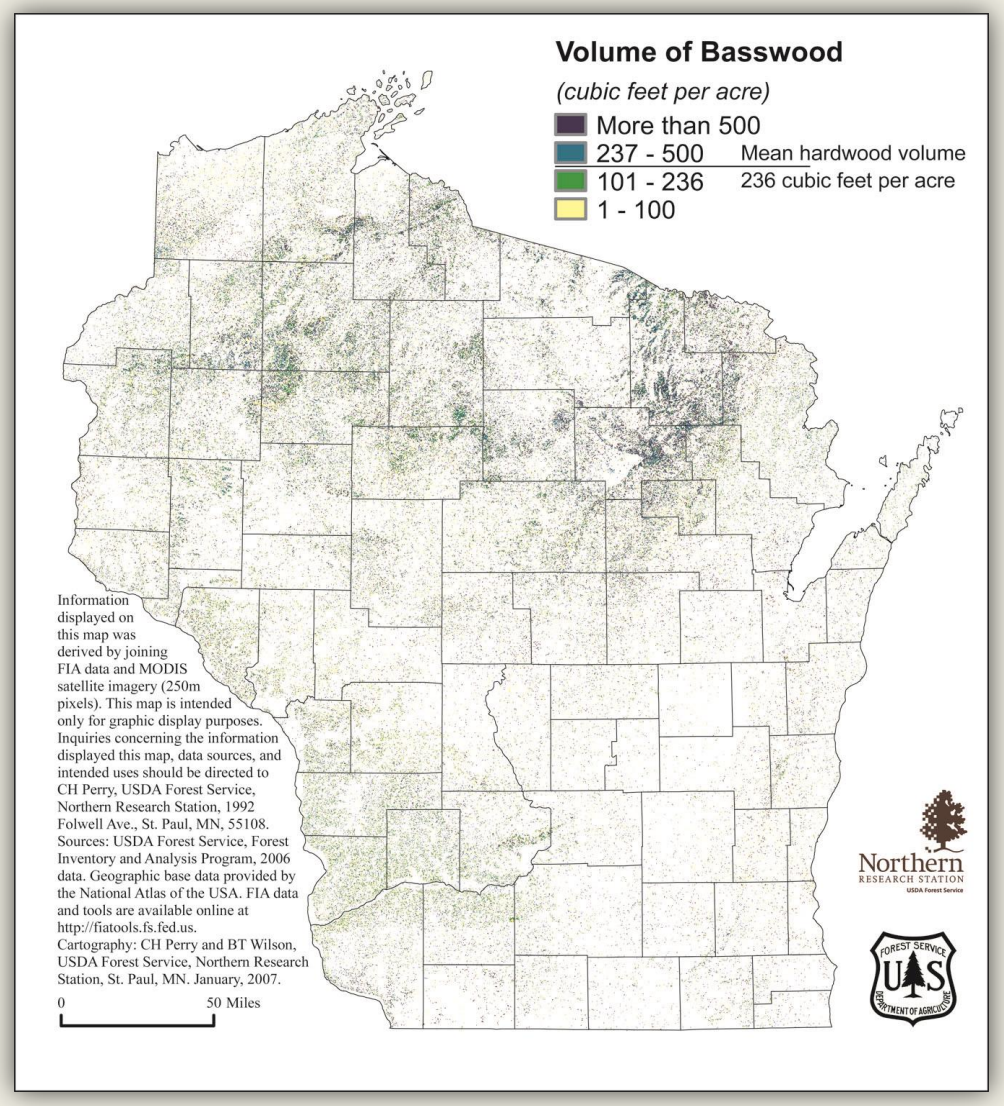


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2012.
Source: USDA Forest Inventory and Analysis data 1996, and 2012.

"Where does basswood grow in Wisconsin?"

Growing stock volume by region with map



About 64% of all basswood volume is located in northern Wisconsin with another one quarter in the central and southwest parts of the state.

Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total
Basswood	128	371	402	113	191	1,204
% of total	11%	31%	33%	9%	16%	100%

Source: USDA Forest Service, Forest Inventory and Analysis 2012 data

For a table on **Volume by County for 2012** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf

"How fast is basswood growing?"

Average annual net growth by region and year

Average annual net growth, about 26.9 million cft per year from 2008 to 2012, accounts for 4.7% of total statewide growth (Chart 4). The growth rate has increased by 32% since 1996.

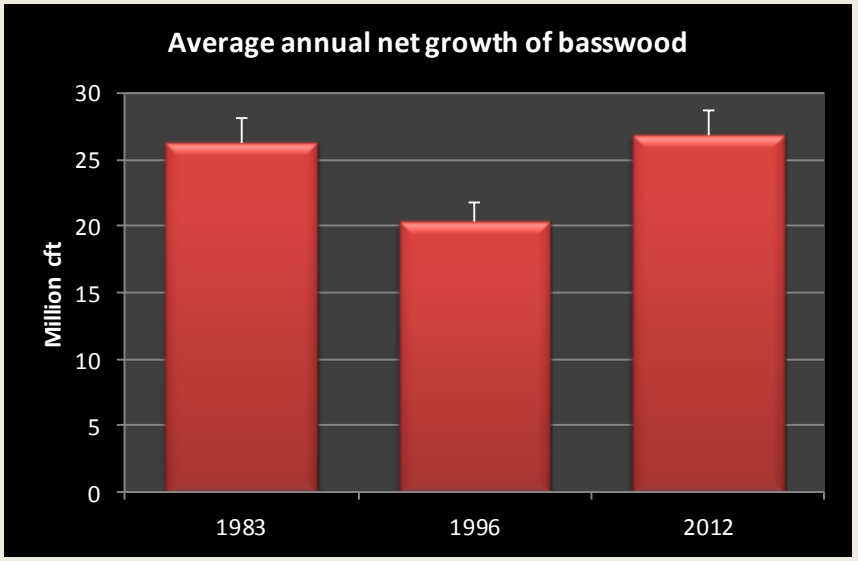


Chart 4. Average annual net growth (million cubic feet).
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2012

Average annual net growth (million cft/year) and ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Central	3.0	11%	**2.3%**
Northeast	7.2	27%	**1.9%**
Northwest	6.4	24%	**1.6%**
Southeast	4.7	17%	**4.1%**
Southwest	5.5	21%	**2.9%**
Statewide	**26.9**	**100%**	**2.2%**

Source: USDA Forest Inventory and Analysis 2012.

The highest volume growth for basswood is in the northern part of the state but the highest rates of growth to volume are in southern Wisconsin.

The average ratio of net growth to volume for basswood is 2.2%, **lower than the statewide average** of 2.6% for all species.

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How healthy is basswood in Wisconsin?"

Average annual mortality: 1983, 1996 and 2012

Average annual mortality of basswood from 2008 to 2012 was about 6.3 million cft, or 2.7% of statewide mortality (Chart 5). This rate has decreased significantly since 1996.

The ratio of mortality to gross growth is about 19% for basswood. This is **significantly lower than the average** for all species in Wisconsin which is 28.8%.

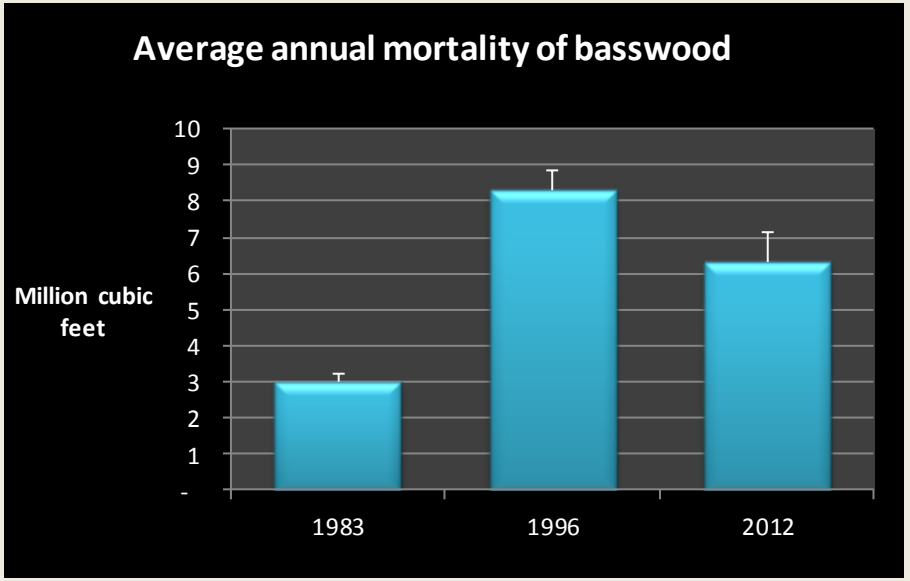


Chart 5. Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2012

Mortality, gross growth, and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
American Basswood	6,285,726	33,142,719	**19.0%**

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How much basswood do we harvest?"

Roundwood production by product and year

In 2009, Wisconsin produced about 15.4 million cft of basswood roundwood, or about 4.2% of the total harvest (Chart 6). Poles, posts and pilings accounted for almost 50%.

Basswood pulpwood accounted for only 1.4% of statewide production, whereas composite products made up almost 10% of the total for the state.

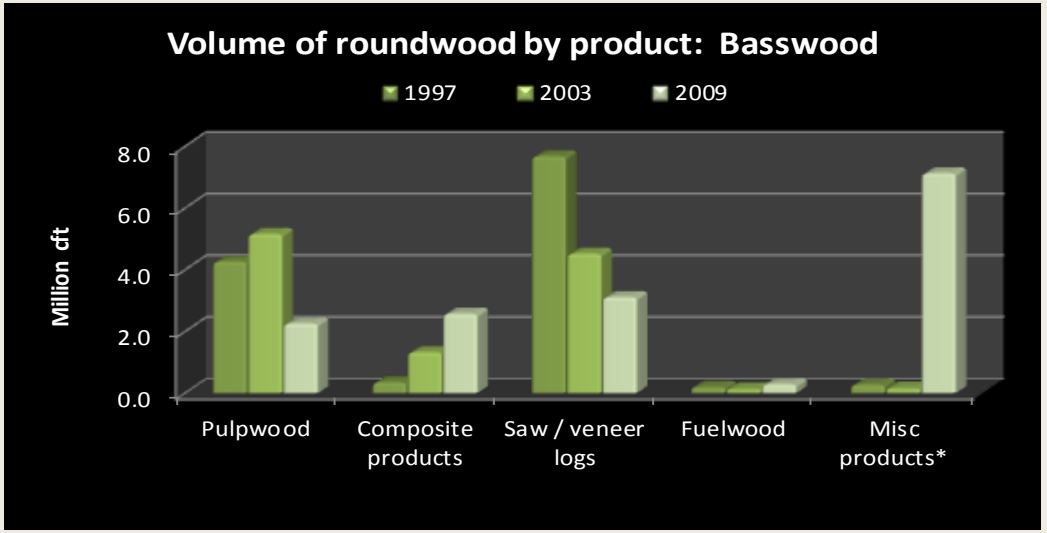


Chart 6. Volume of roundwood products. * Miscellaneous products include poles, posts and pilings.
Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN

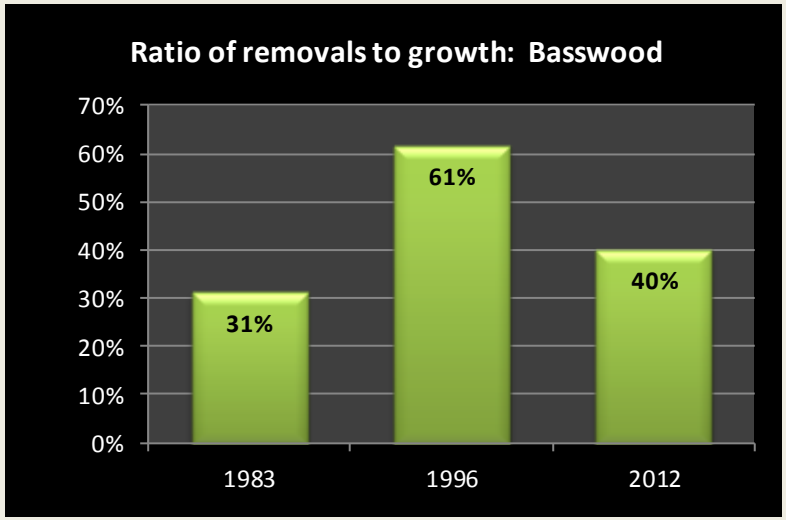


Chart 7. Ratio of volume harvested annually to net growth.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2012.

The ratio of removals to growth is 40% for basswood, lower than the statewide average ratio of 53% (Chart 7). Whereas basswood accounts for 5.6% of growing stock volume in the state, it makes up 3.5% of removals.

For a table of **Average annual growth, mortality and removals by region** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf

"How much is basswood selling for?"

Prices for cordwood and sawtimber: 2000 to present

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: Timber Mart North (Chart 8) and weighted average stumpage prices from Wisconsin Administrative Code Chapter NR 46 (table below).

Stumpage prices for both pulpwood and sawtimber, as reported in the Timber Mart North, have decreased since 2000. Delivered pulpwood, on the other hand, has actually increased in price since 2000.

Average weighted stumpage values, as reported in Wisconsin administrative code, are lower than the statewide average for all products.

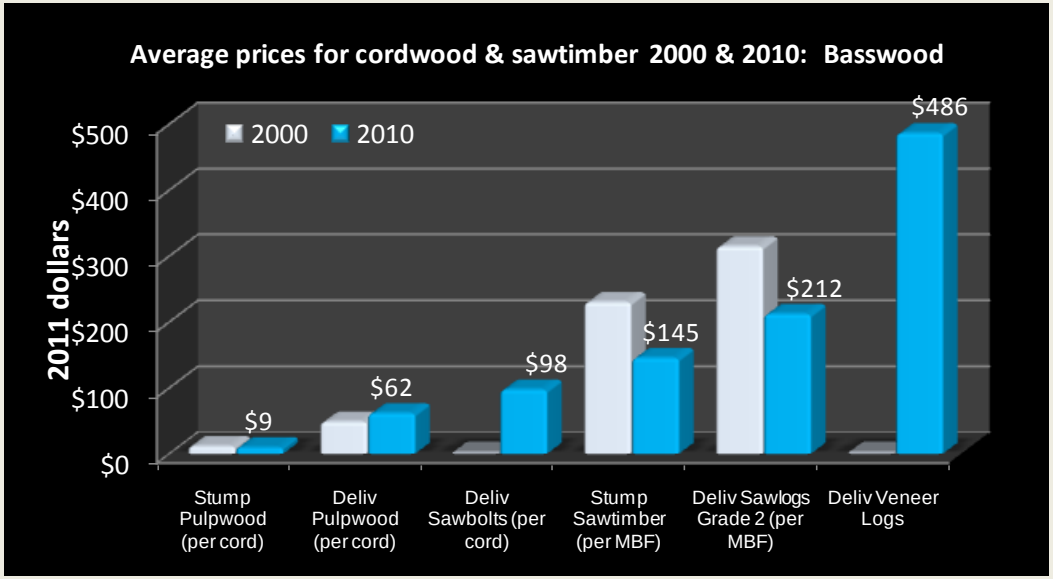
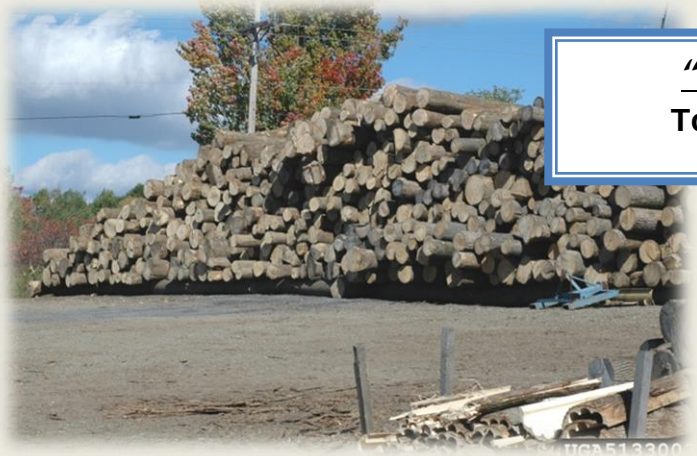


Chart 8. Average prices for cordwood and sawtimber (2012).
Source: Timber Mart North, George Banzhaf & Company, 8301 N. Allen Lane, Milwaukee, WI 53217

Average weighted stumpage prices (adjusted for inflation to 2012 dollars) by year for Wisconsin.

Product	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012	Average for all hardwoods
Cordwood (per cord)	$7	$8	$9	$16	$12	$10	$8	$9	$9	$8	$19
Logs (per MBF)	$197	$169	$207	$203	$149	$146	$135	$132	$130	$135	$148

Source: Wisconsin Administrative Code Chapter NR46, 2002 to 2012. The stumpage values calculated each year are for the sole purpose of assessing MFL yield and FCL severance taxes, not for determining the price that should be received for timber.



"How much basswood biomass do we have?"

Tons of aboveground carbon by region of the state

There were 21.4 million short tons of aboveground biomass in live basswood trees in 2012, up from about 15.2 million tons in 1983, an increase of 40.5%. This is equivalent to approximately 10.7 million tons of carbon and represents 3.4% of all aboveground biomass statewide. As with volume, most basswood is located in northern Wisconsin (Chart 9).

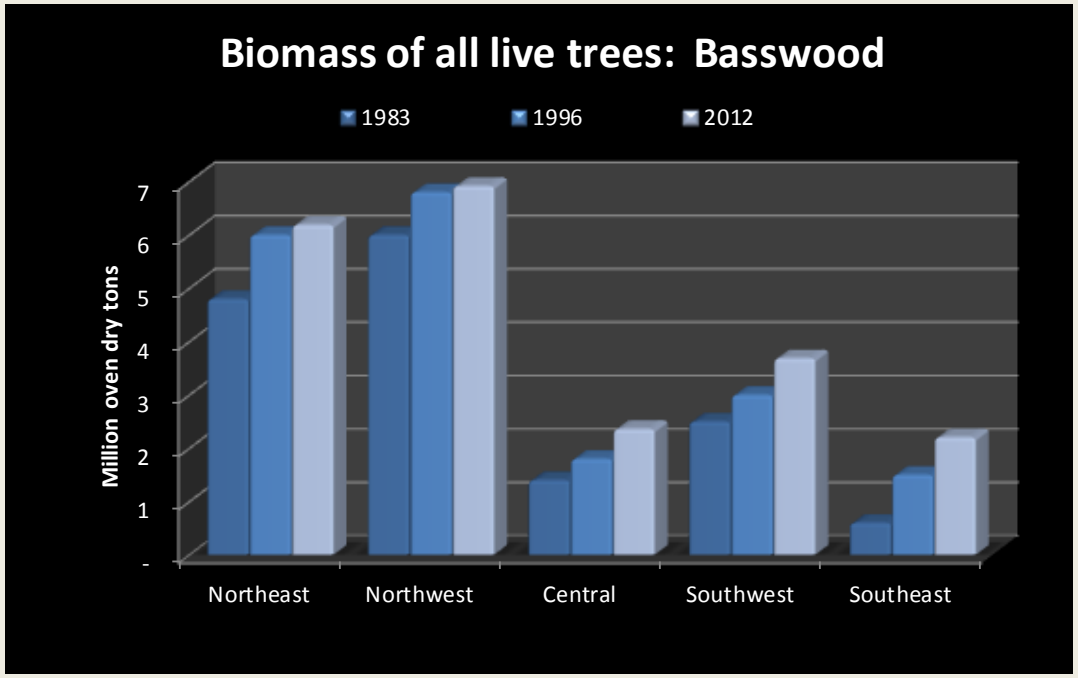


Chart 9. Biomass (above ground dry weight of live trees >1 in dbh, short tons) by year and region of the state.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012

Basswood has the lowest density of any of the commercial hardwood species in Wisconsin, with a ratio of biomass to volume of 32.1 oven-dry lbs. per cubic foot. The average for all hardwoods is about 50.1 ODP/cft and for all trees is 46.8 ODP/cft. Approximately, 75.4% of all biomass is located in the bole and 21% in the top branches.

For a table of **Biomass by County for 2012** go to:
http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/BiomassByCounty.pdf